

Total Gaseous Mercury at Chebogue Pt.

July 6 to August 13, 2004

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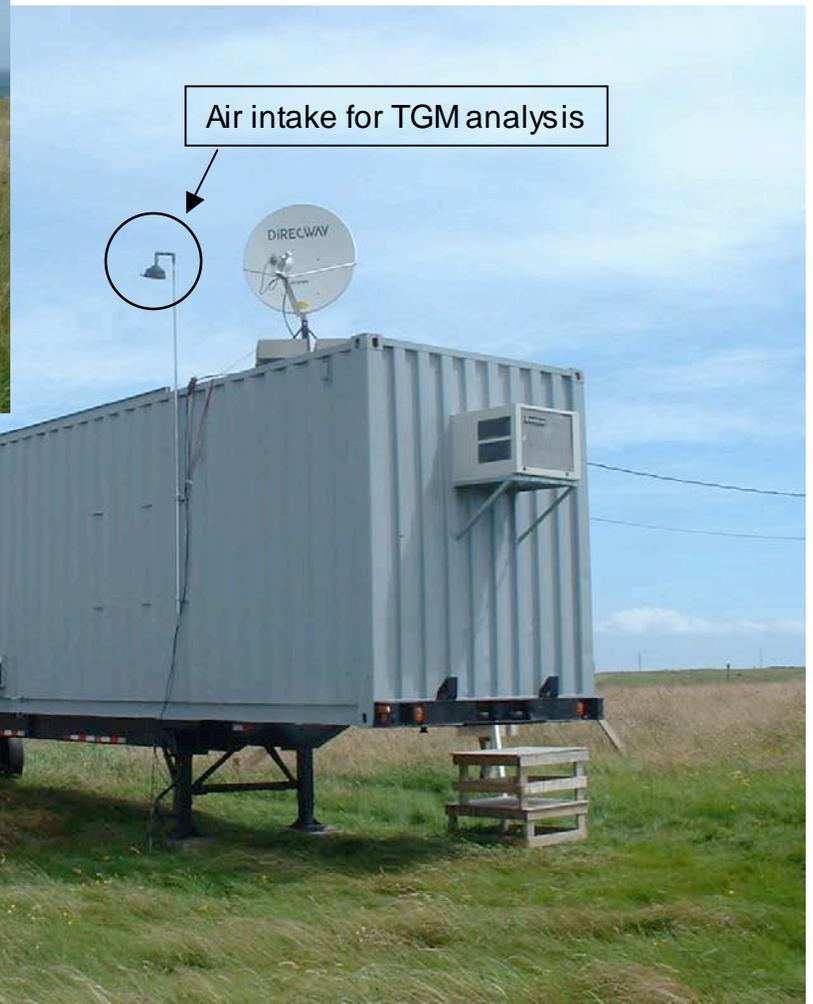
Environment
Canada

Environnement
Canada

Canada

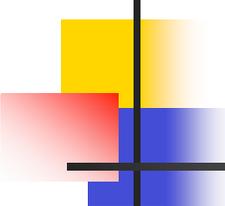
Chebogue Point 2004

....on a rare clear day....



The Total Gaseous Mercury was sampled and analysed on site from Dr. Tom Duck's CABOT* Container

*Canadian Atmosphere-Biosphere Observations Trailer



Sampling....what did we do.....

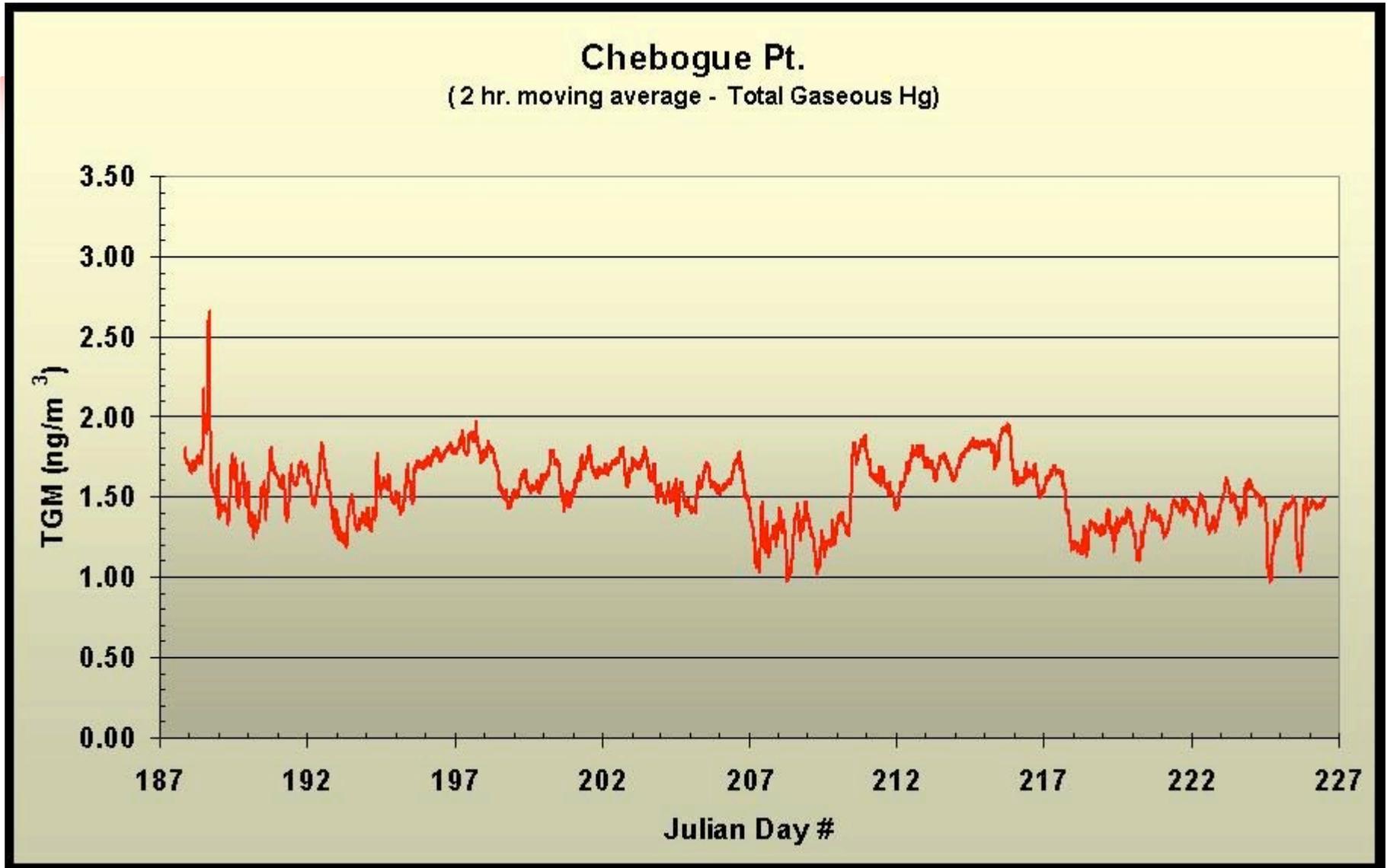
The ambient air concentration of total gaseous mercury (TGM) was measured over 5 minute intervals with a Tekran Model 2537A Mercury Vapour Analyzer. This instrument provides continuous analysis of TGM (Hg^0) in air at sub-ng m^{-3} levels.

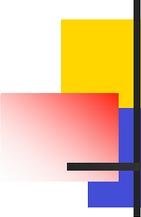
This Hg analyser was set up in the “CABOT” container with the air intake height set at $\approx 4\text{m}$ off the ground.

The Tekran analyser was calibrated on site every 25 hours using an internal Hg permeation source.

Average = 1.54 ng/m³

Range = 0.82 - 2.98 ng/m³





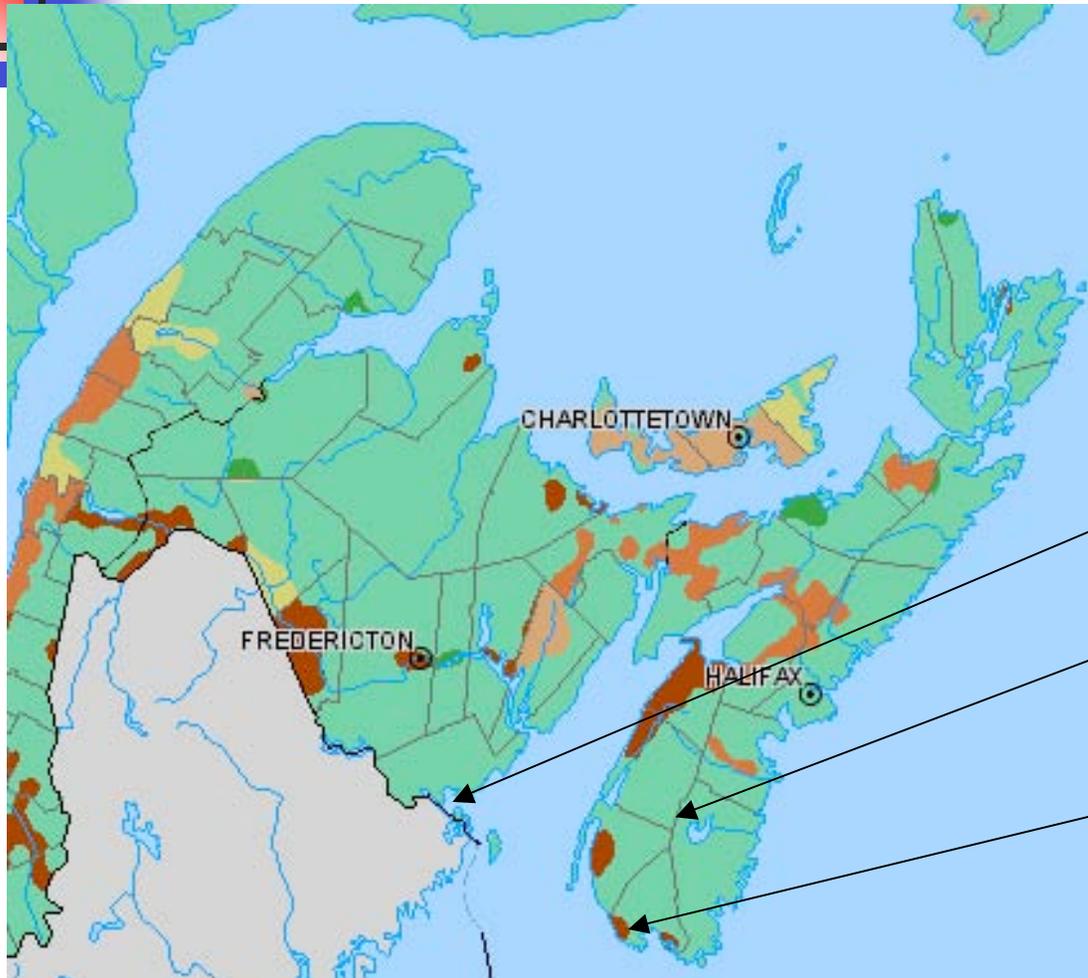
For the ground level TGM measured over this time period...

Are there any relationships with Goldstein's on-site meteorological data?

The quick answer is no.....Pearson Correlation calculations showed little if any association of TGM with any of the MET parameters measured on-site by Goldstein's group....

Finally....**we did not** see any indication of a transport event measured in the “ground level” TGM data.

How does the TGM data compare with two other local CAMNet sites?



**St. Andrews
New Brunswick**

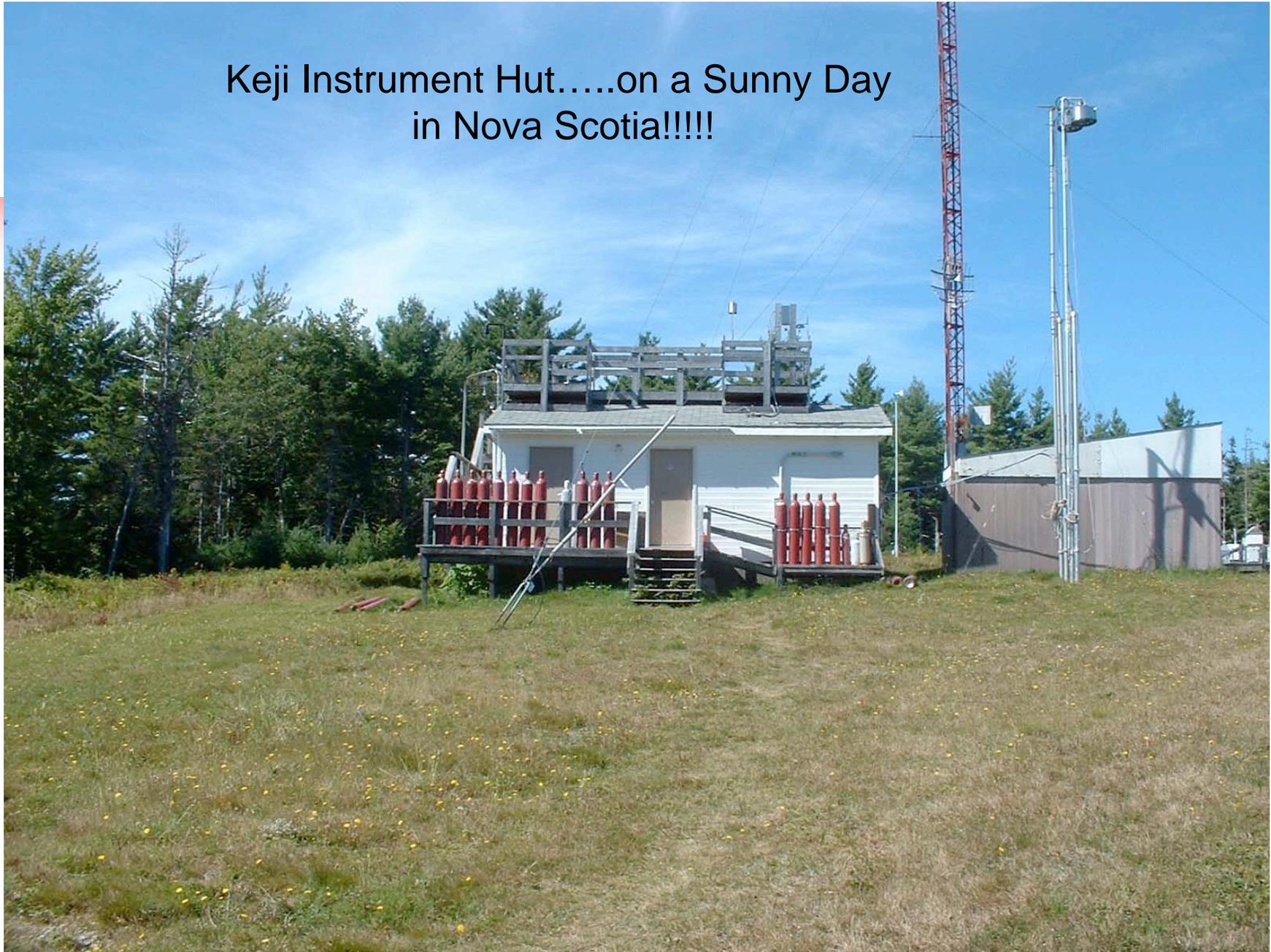
Kejimkujik Nat. Park

Chebogue Point

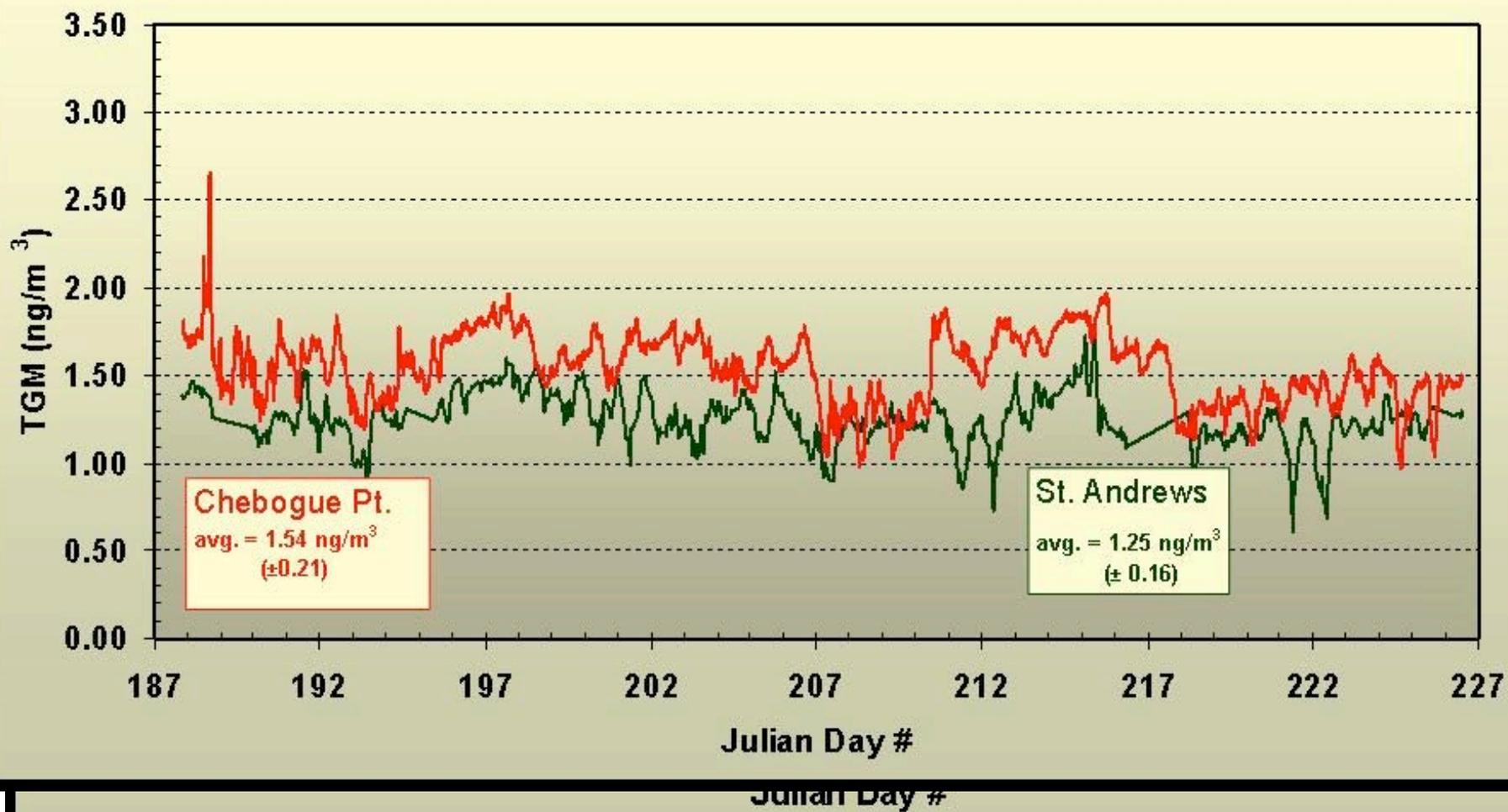
Kejimkujik - CAMNet Site

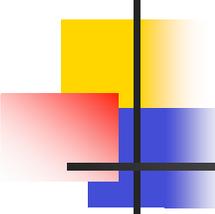


Keji Instrument Hut.....on a Sunny Day
in Nova Scotia!!!!



Chebogue Pt. vs St. Andrews





Summary:

- The levels of Total Gaseous Mercury measured at the Chebogue Point site were not significantly different from levels measured at two adjacent CAMNet sites in the region (Kejimkujik and St. Andrews) during the same time period.
- TGM concentrations measured during this experiment at Chebogue Point were similar to hemispheric background concentrations (~ 1.5 ng/m³).
- There was no indication of a transported “polluted air mass event” from the measured ground level TGM data (July 6 to August 13).

TIMs and the relation to DC3, Ron Brown and Chebogue Pt data



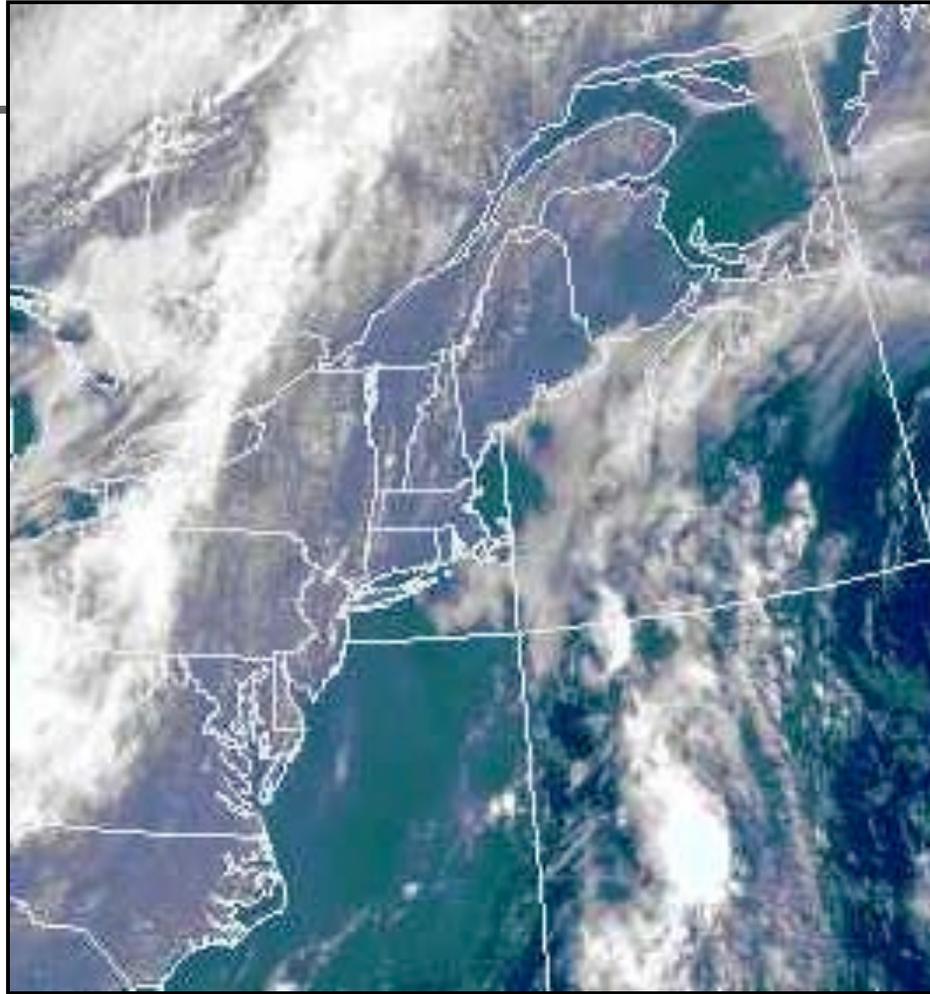
Smog Plume: June 24 2001 (photo courtesy of NOAA)

**David Waugh¹, Steve Beauchamp¹, Richard Leitch²,
Kathy Hayden²**

1 Air Quality Science Division, Dartmouth NS

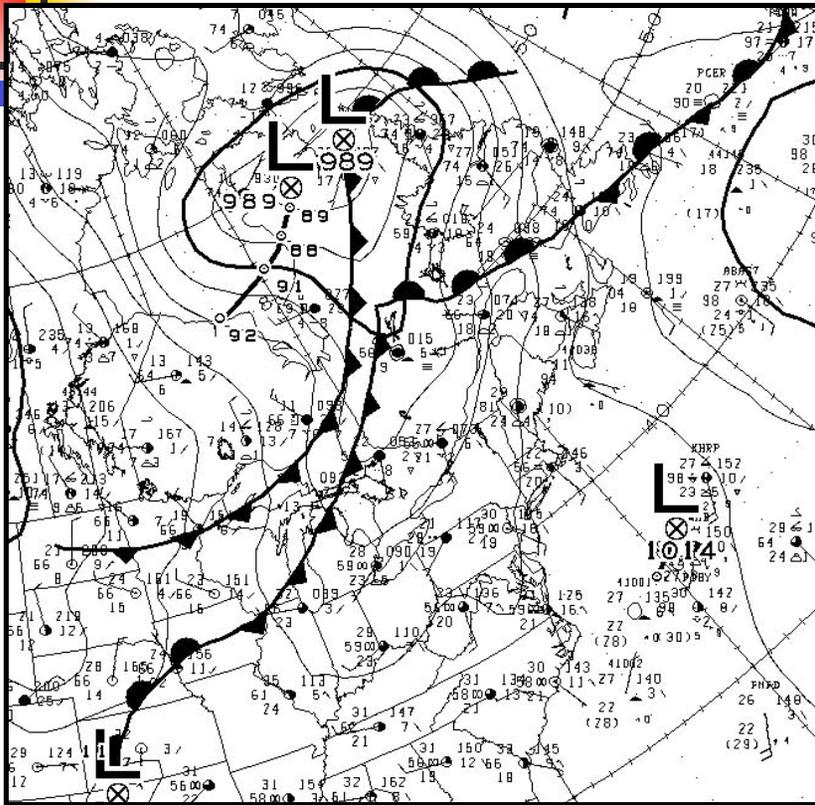
2 Air Quality Research Branch, Toronto, ON

TIMs Flight day - July 22, 2004
GOES visible - 1615 UTC,

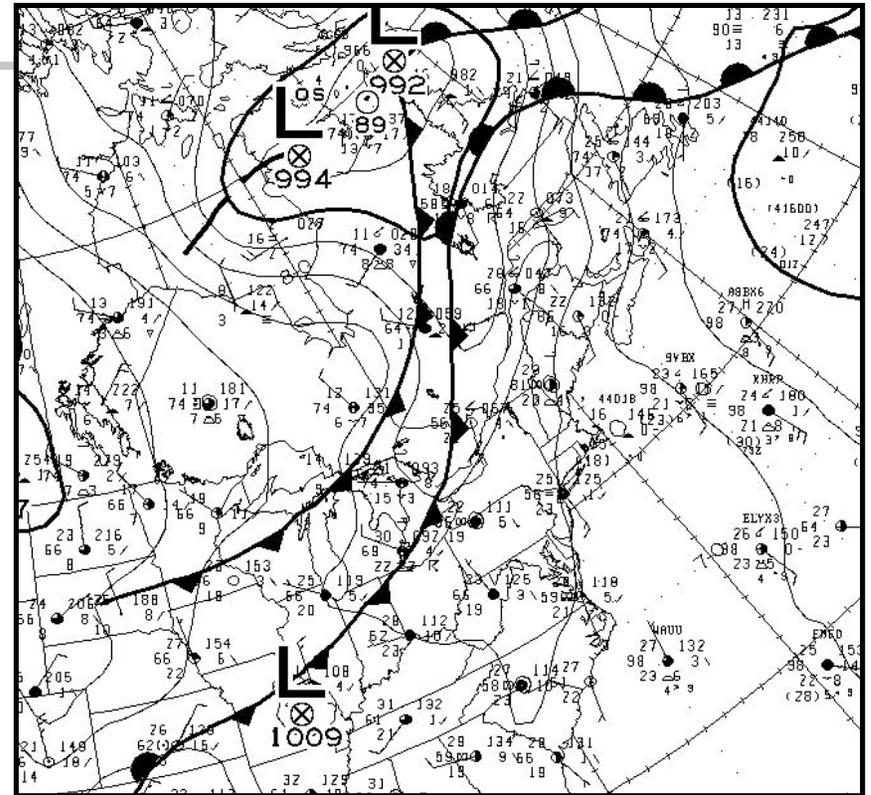


Courtesy CMC archive

Surface Analyses



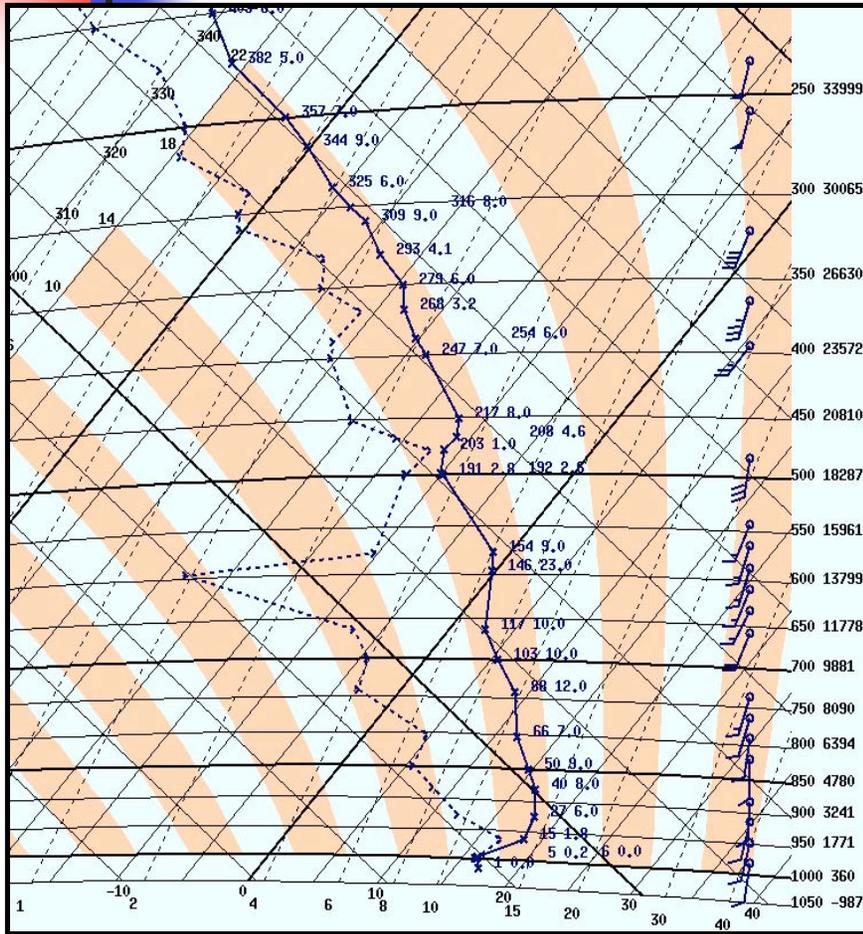
1800 UTC, July 22, 2004



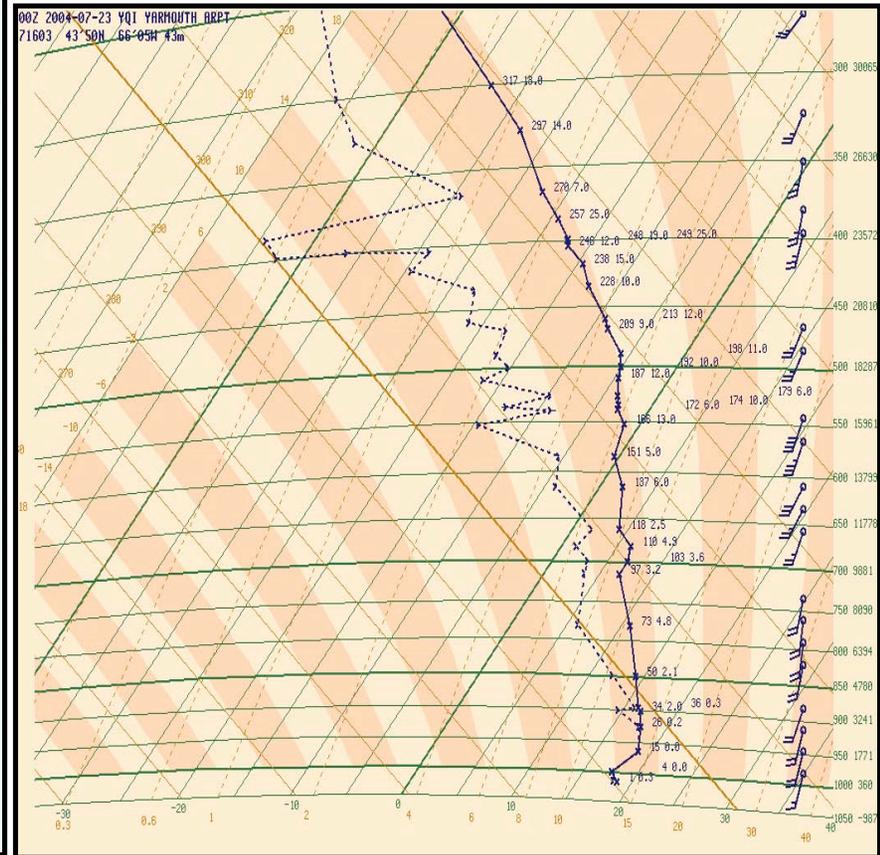
0000 UTC, July 23, 2004

Courtesy CMC archive

Radiosondes – Yarmouth, NS

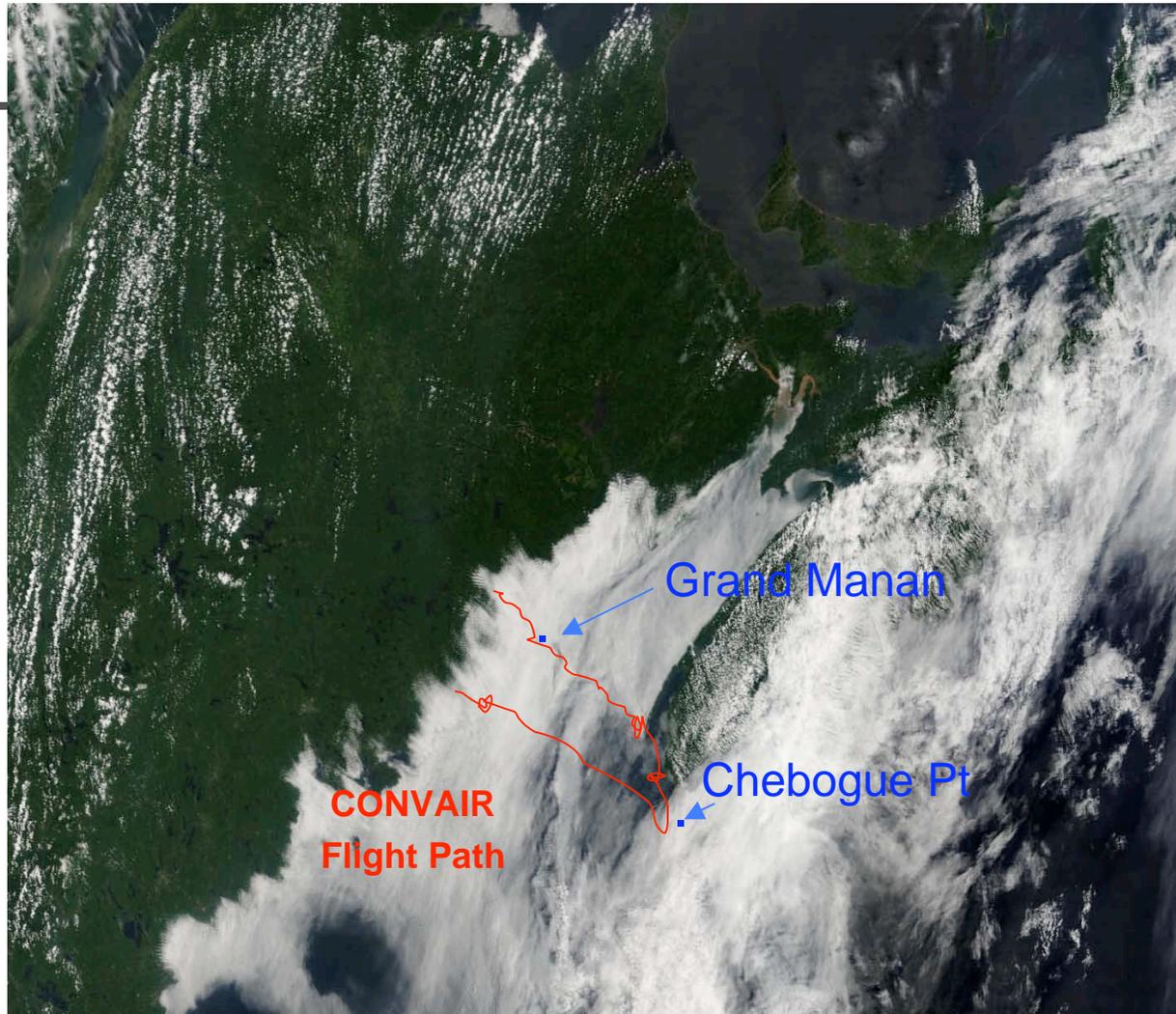
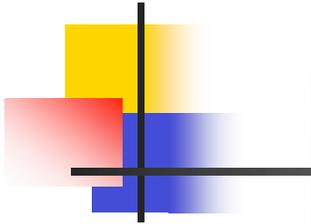


1200 UTC, July 22, 2004



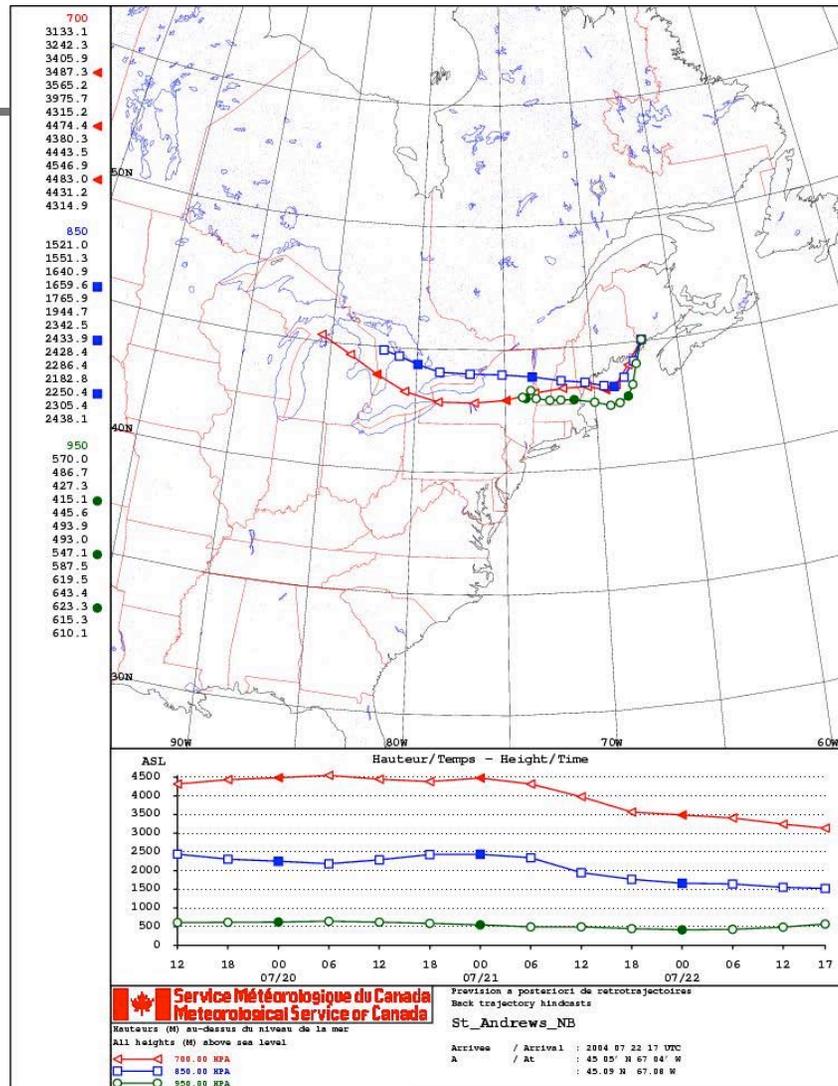
0000 UTC, July 23, 2004

MODIS image 1530 UTC, July 22, 2004



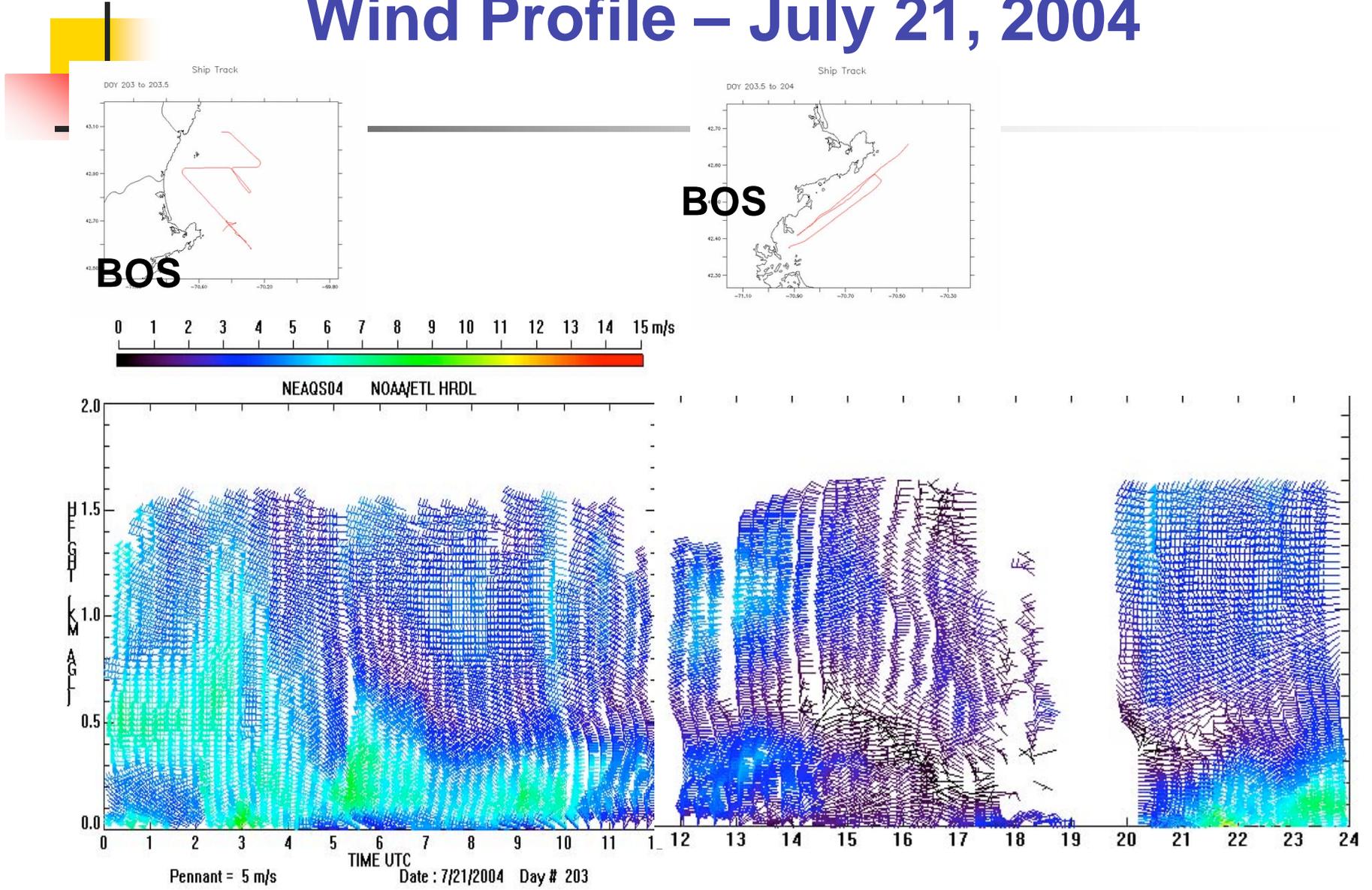
Courtesy MODIS Rapid Response System

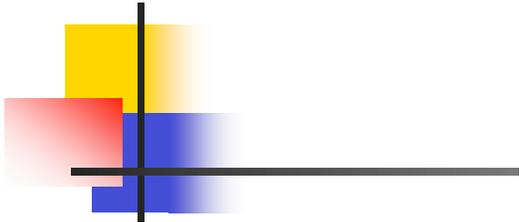
950, 850, 700 hPa Back-trajectories - 1700 UTC, July 22, 2004 – Grand Manan Is, NB



Courtesy CMC archive

Ron Brown – Route and Vertical Wind Profile – July 21, 2004





**ICARTT
DC-3**

LIDAR - Layer
Averaged
(200-1500m)
Ozone concentration
July 21-22, 2004

(super-imposed cross-
sectional views)

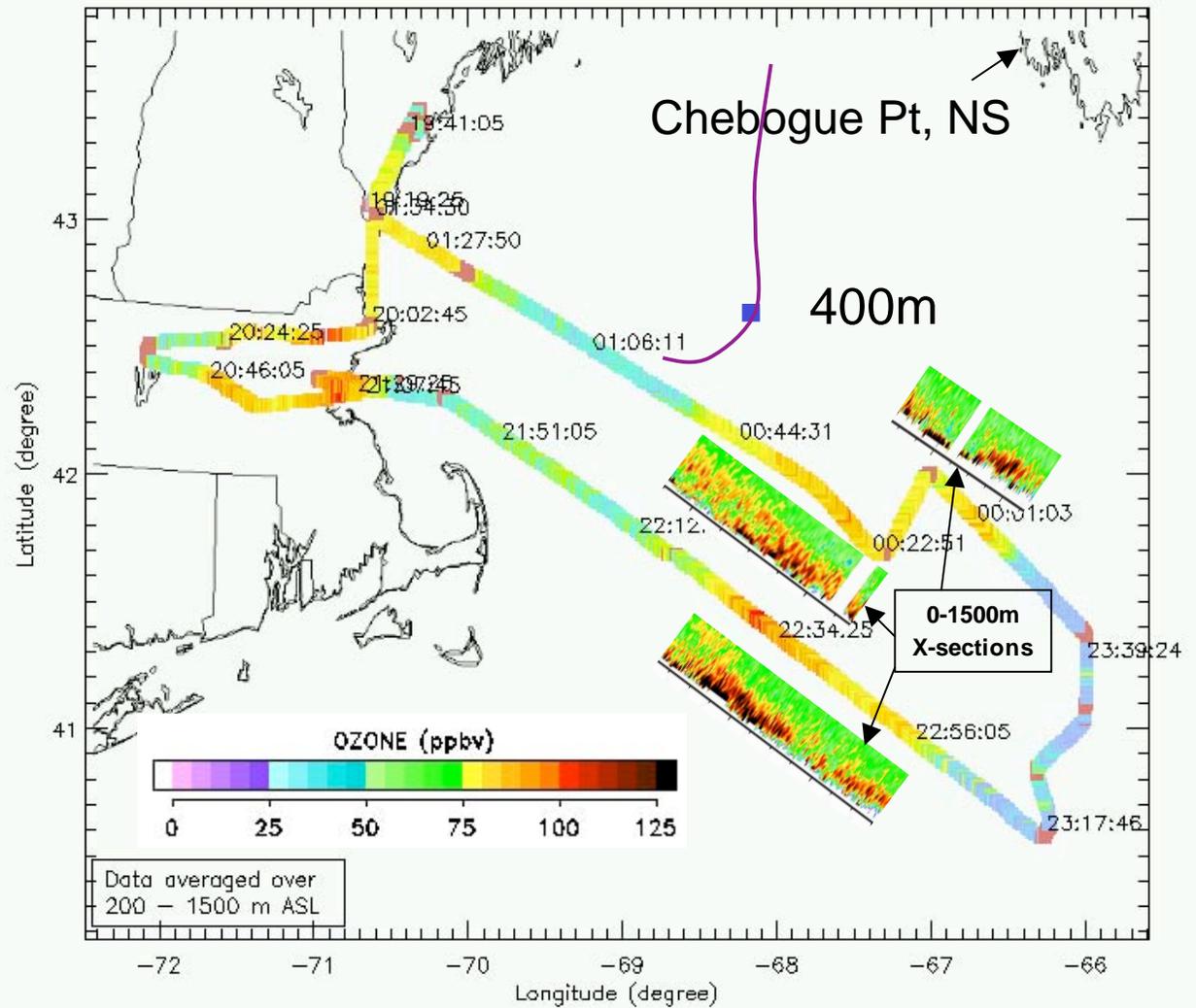
Plane position 21 JUL 2004

NOAA/ETL
Airborne Ozone Lidar

Lidar OZONE (ppbv)

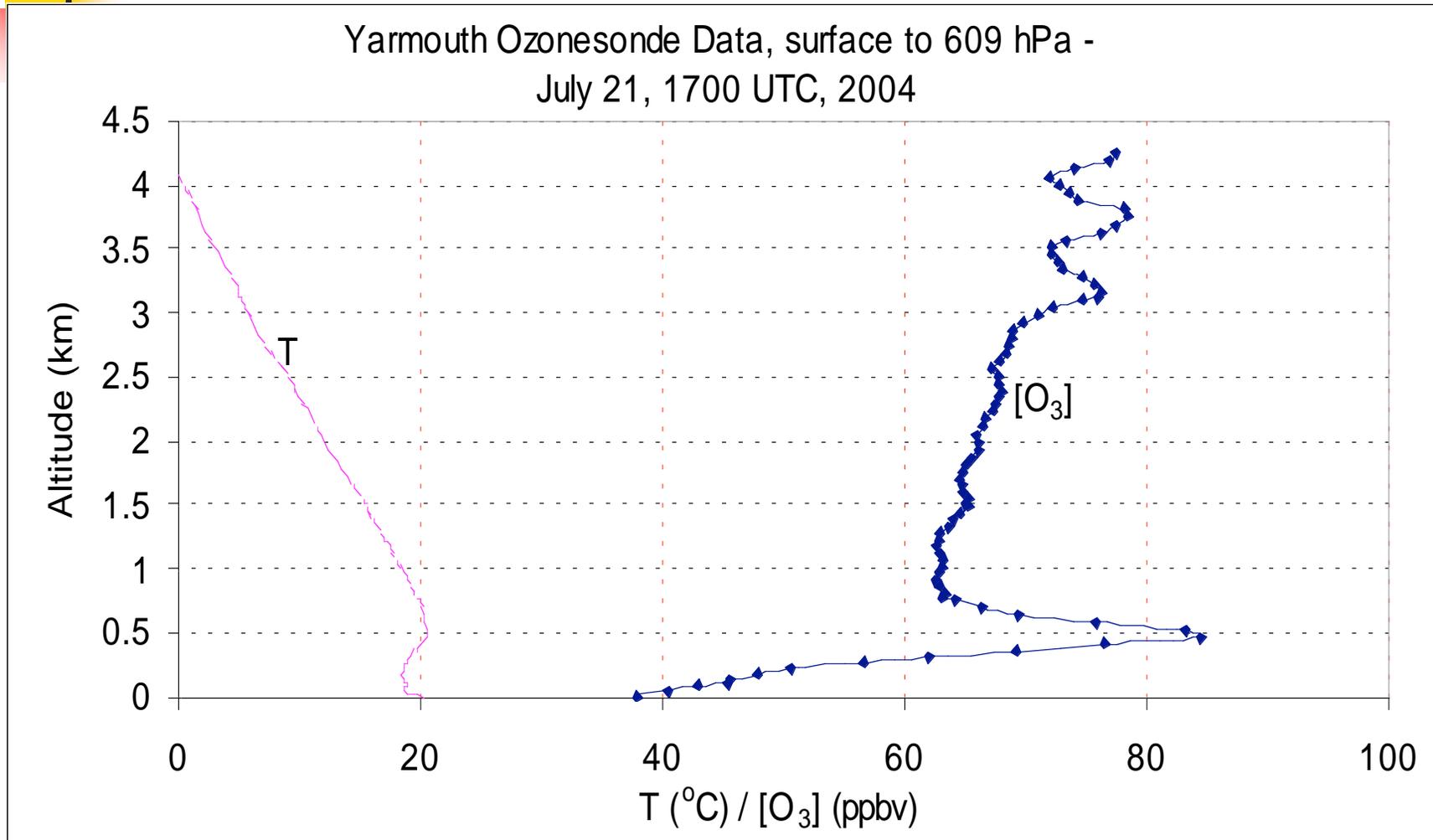
0. 10. 20. 30. 40. 50. 60. 70. 80. 90. 100.

19:19 - 01:35 UTC



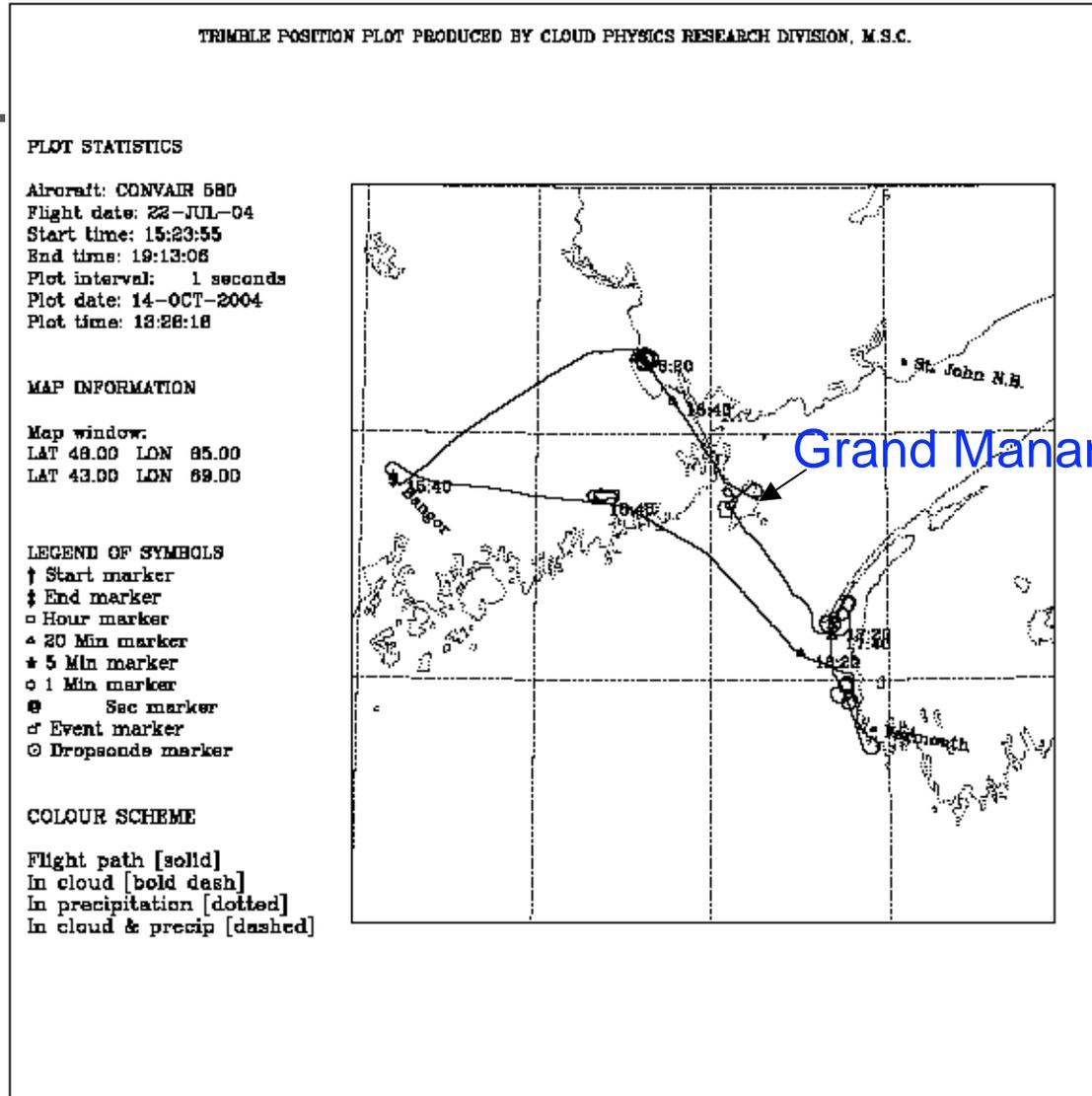
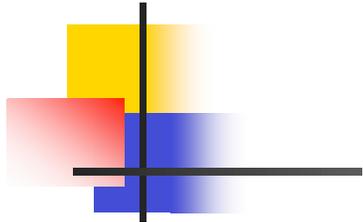
Courtesy ETL-NOAA

Yarmouth Ozonesonde 1700 UTC, July 21, 2004

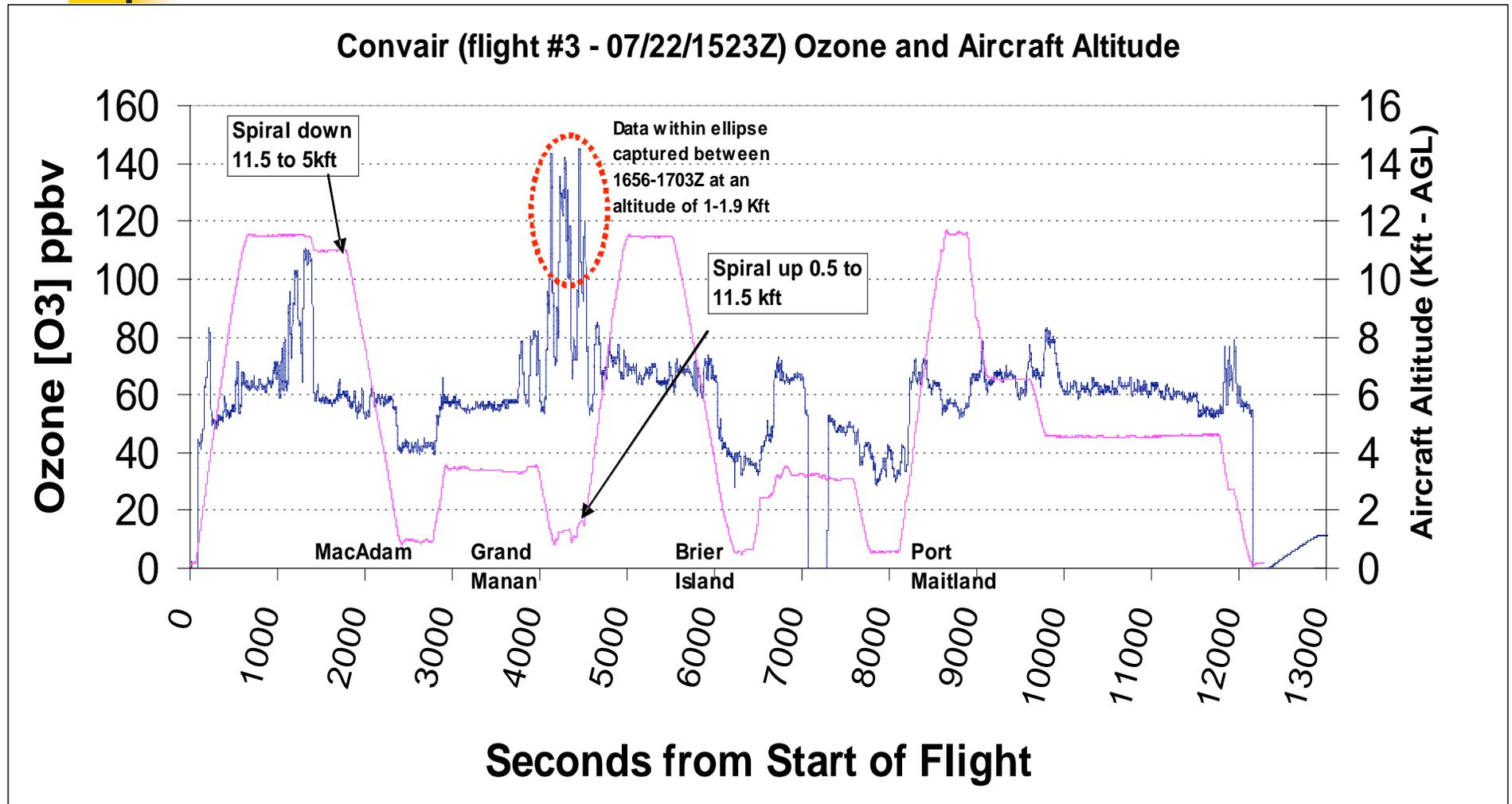


Courtesy Anne Thompson (NASA/GSFC), David Tarasick (EC/MSC)

Flight Route CONVAIR flight #3 – July 22, 2004

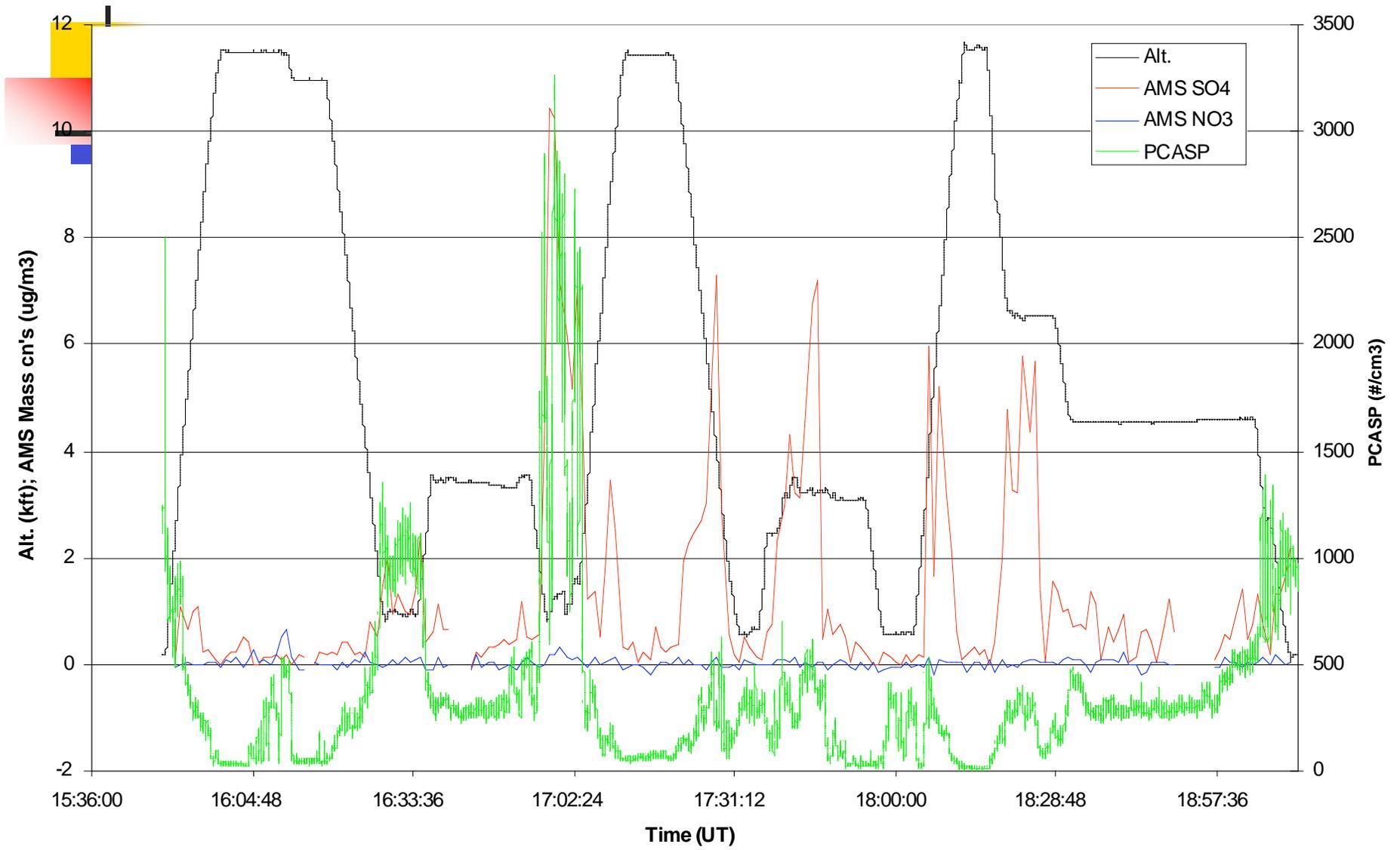


TIMs flight – [O₃] vs Altitude – July 22, 2004

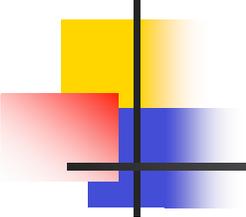


Courtesy CTC/TIMs CONVAIR research team

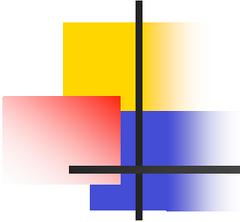
Flight #3 - TIMS#1



Summary

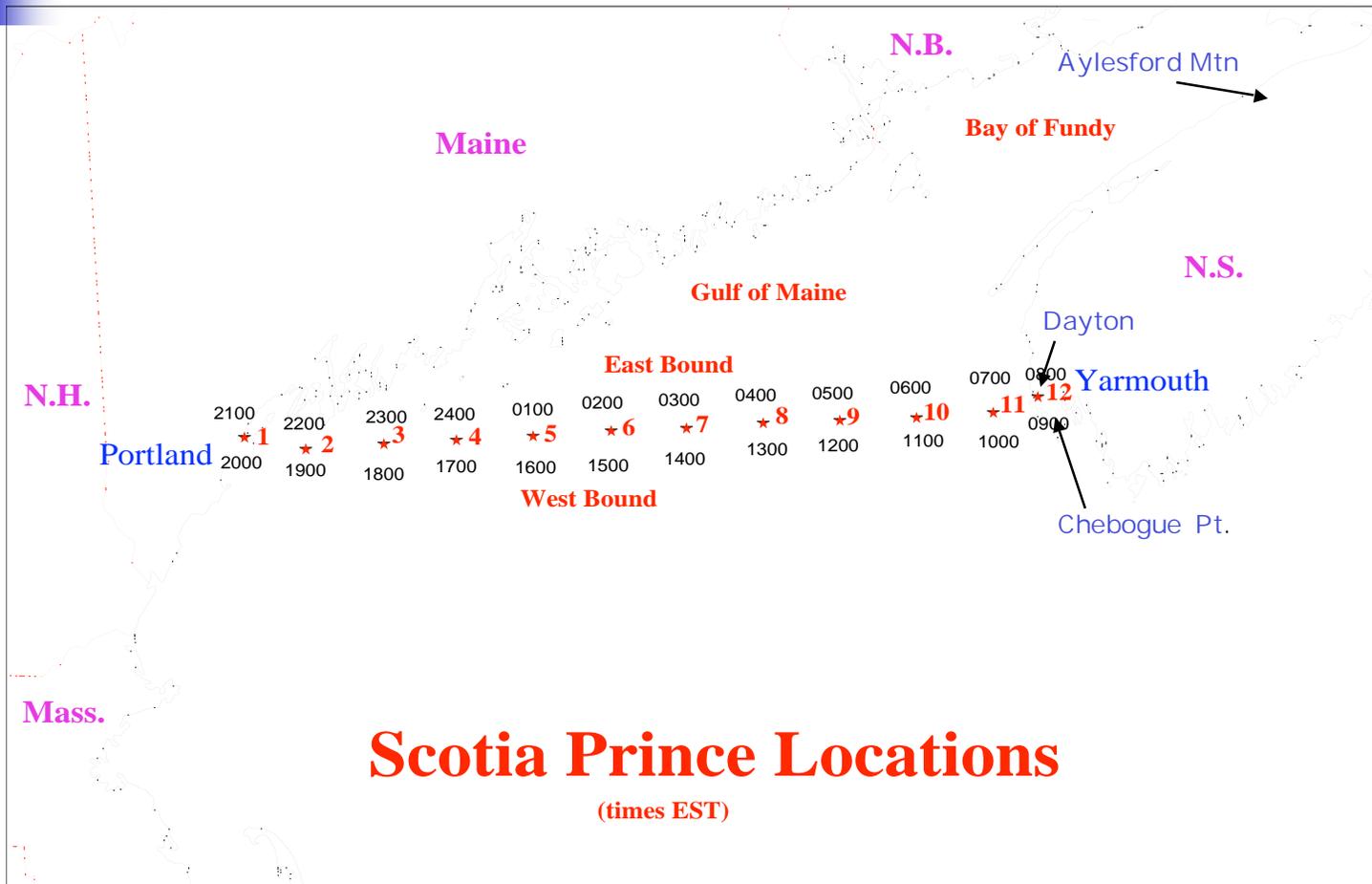
- 
-
- AQ measurements from assorted platforms can be combined spatially and temporally to provide 4D view of pollutant plume development and evolution
 - Implications for understanding cycling – sea breeze/land breeze and subsequent transport over Canadian Maritimes and beyond
 - Implications of AQ forecasting and cloud/fog formation mechanisms
 - What is most effective method to determine transport into the Maritimes?

Surface Analysis 1200 UTC, July 22, 2004

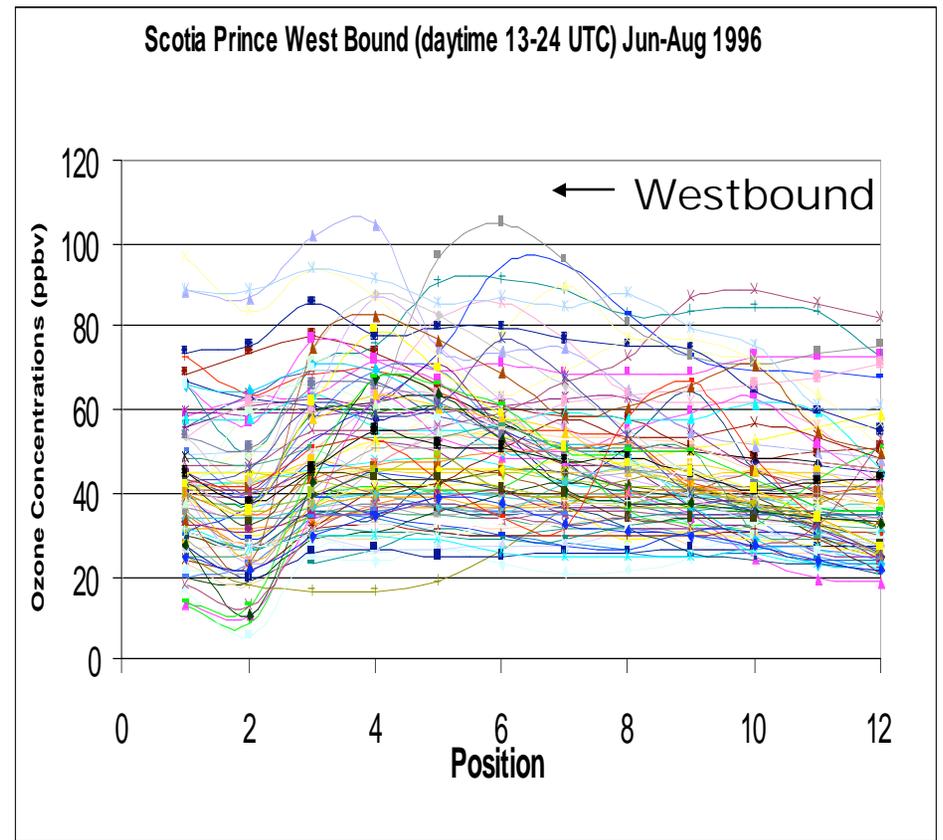
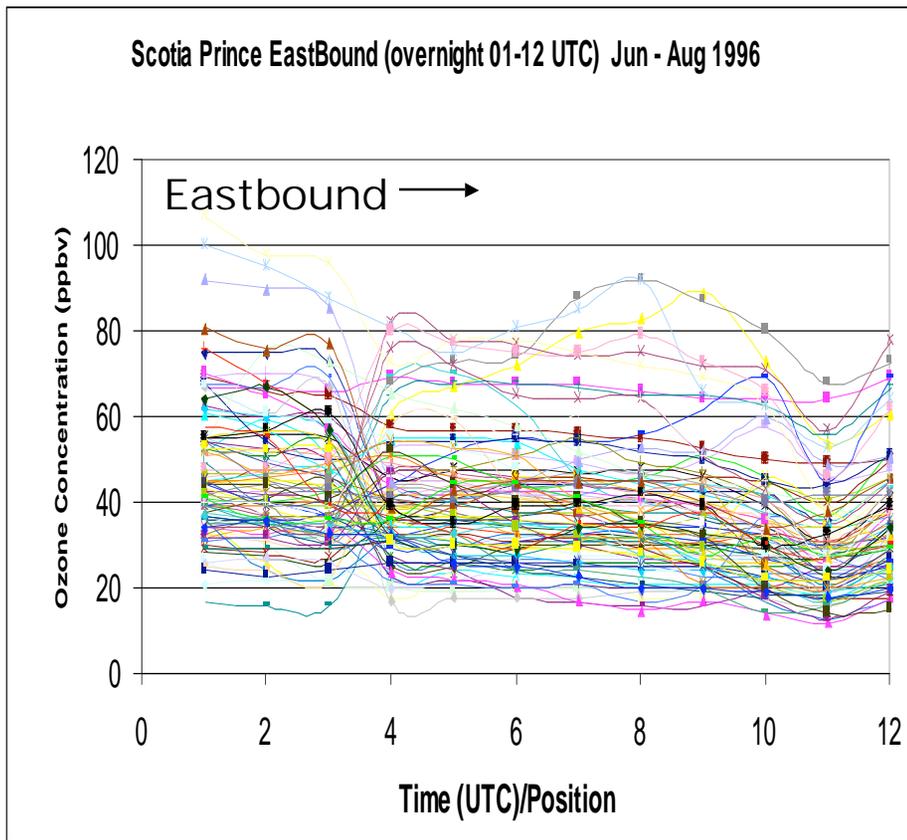
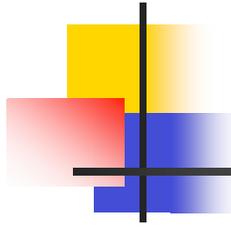


Courtesy CMC archive

Scotia Prince Route



Scotia Prince Ozone Jun-Aug '96

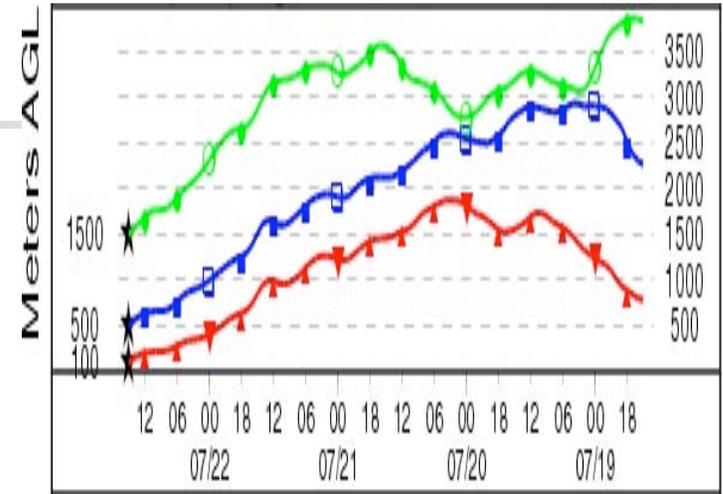
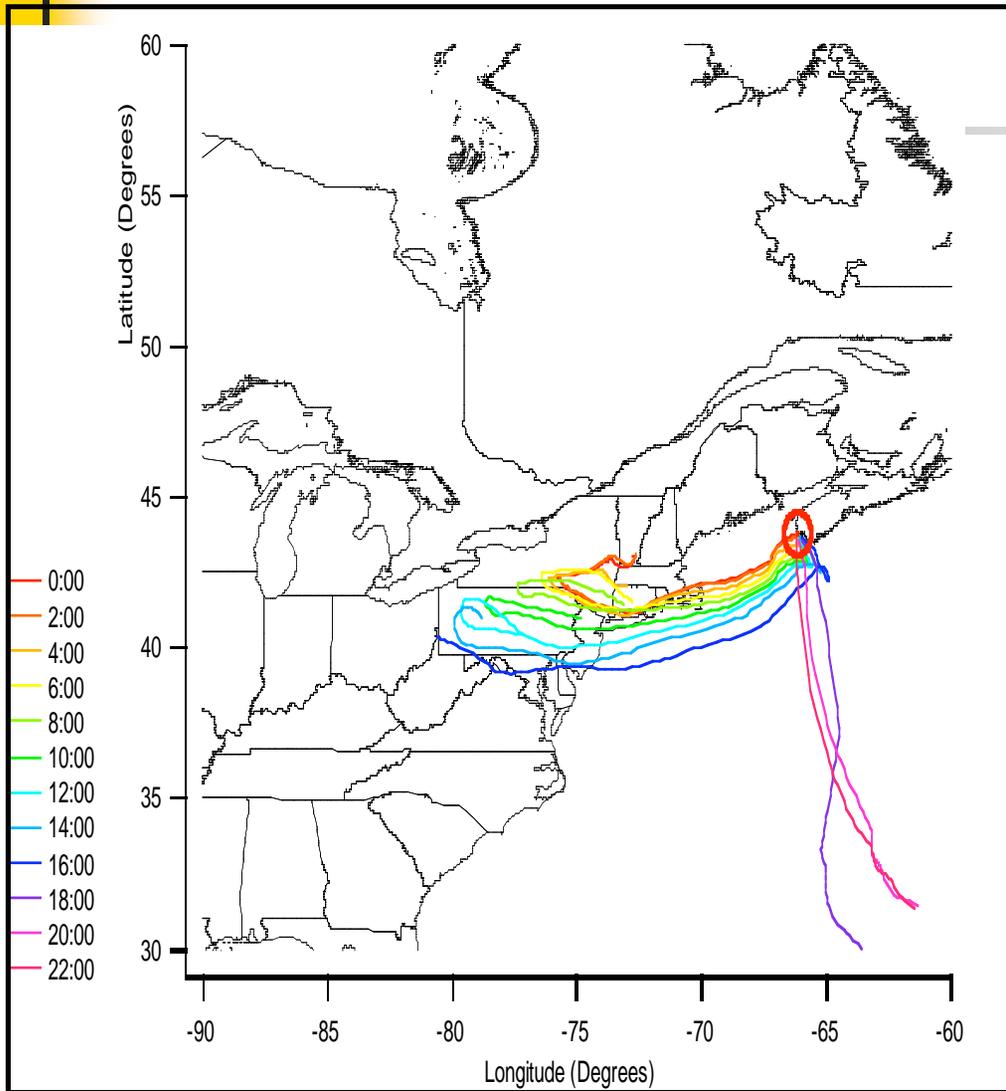


Mean 42 ppbv, Stdev 16.2

23 21 19 17 15 13
← Time

Courtesy Maine DEP

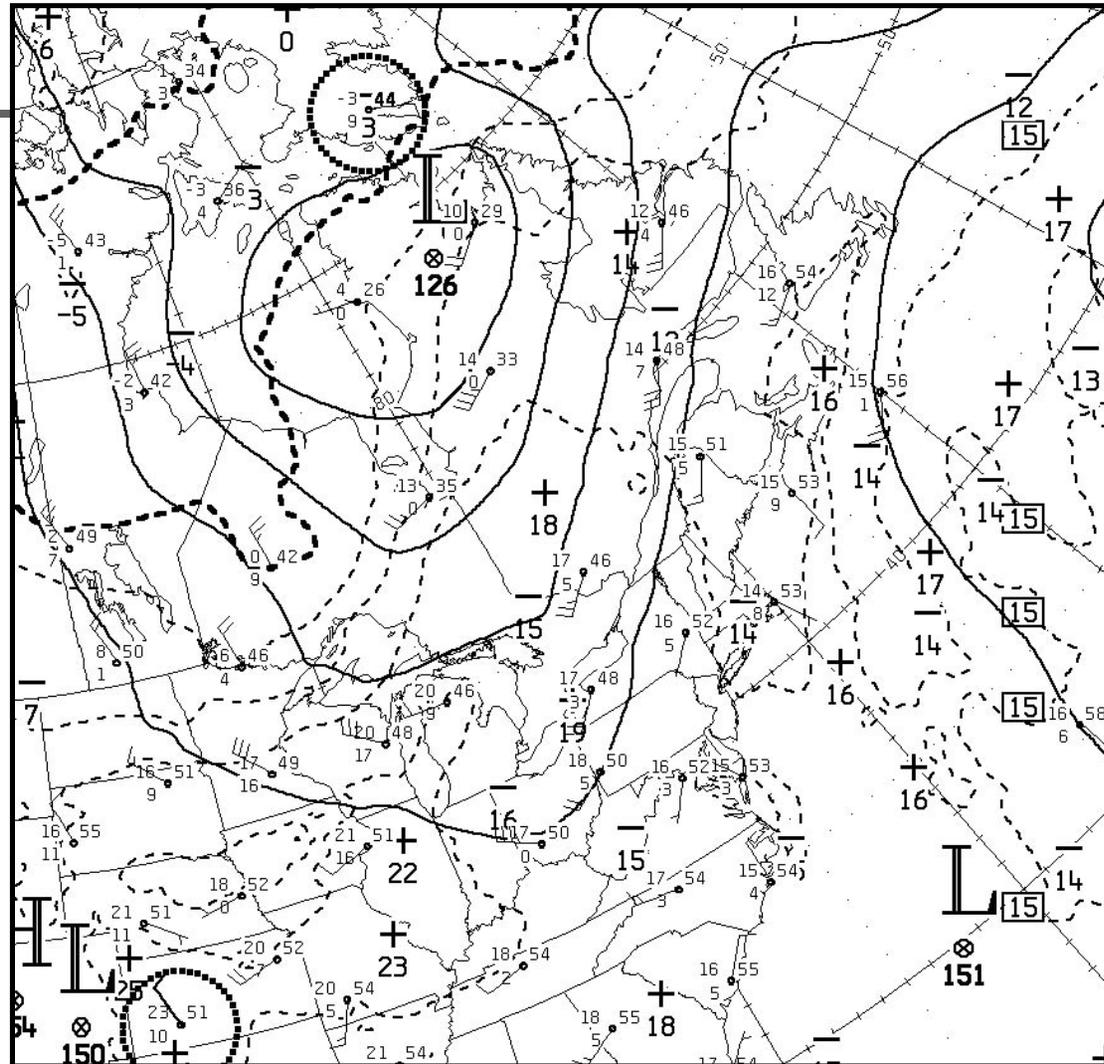
100 metre Back-trajectories – July 22, 2004



Noon

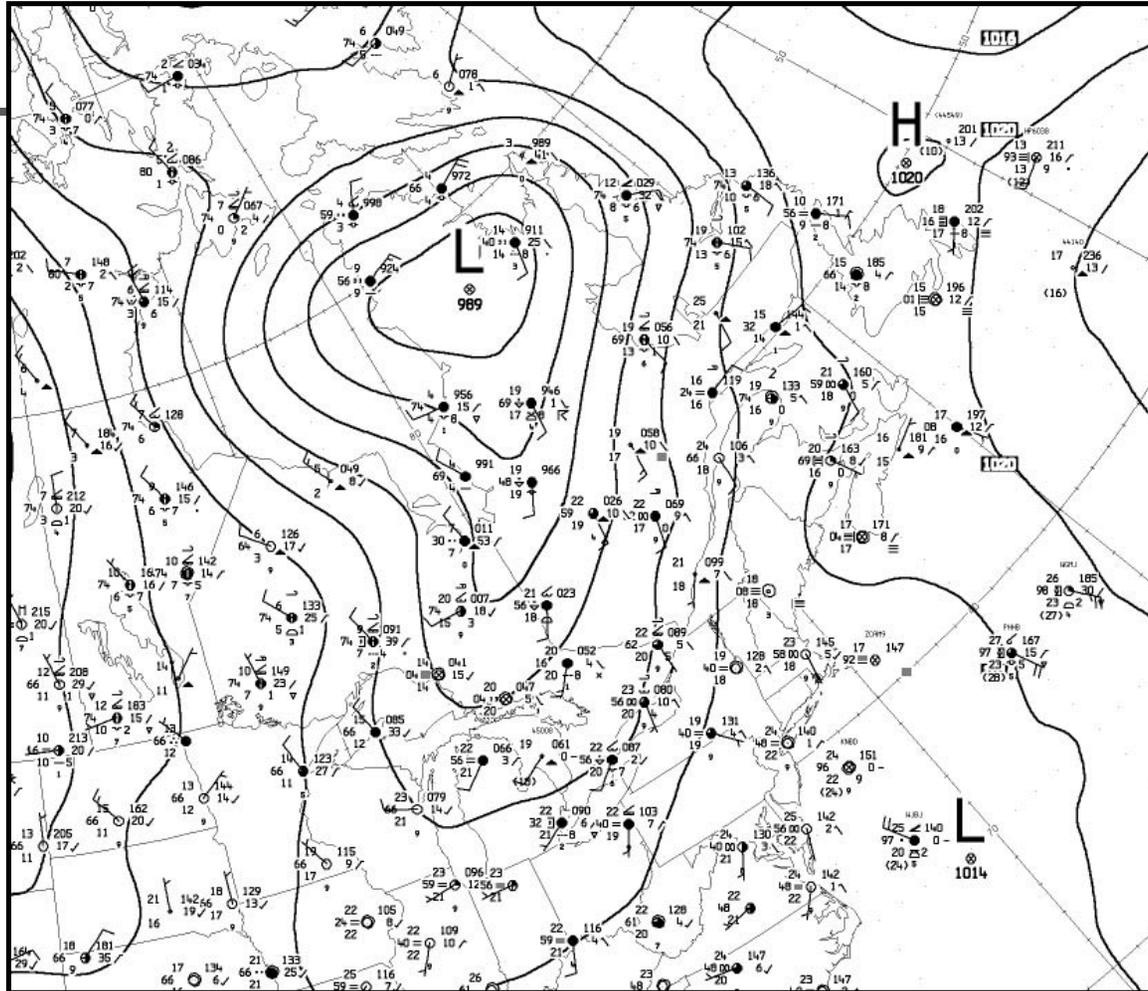
Courtesy Goldstein et al.

850 hPa Analysis 1200 UTC, July 22, 2004



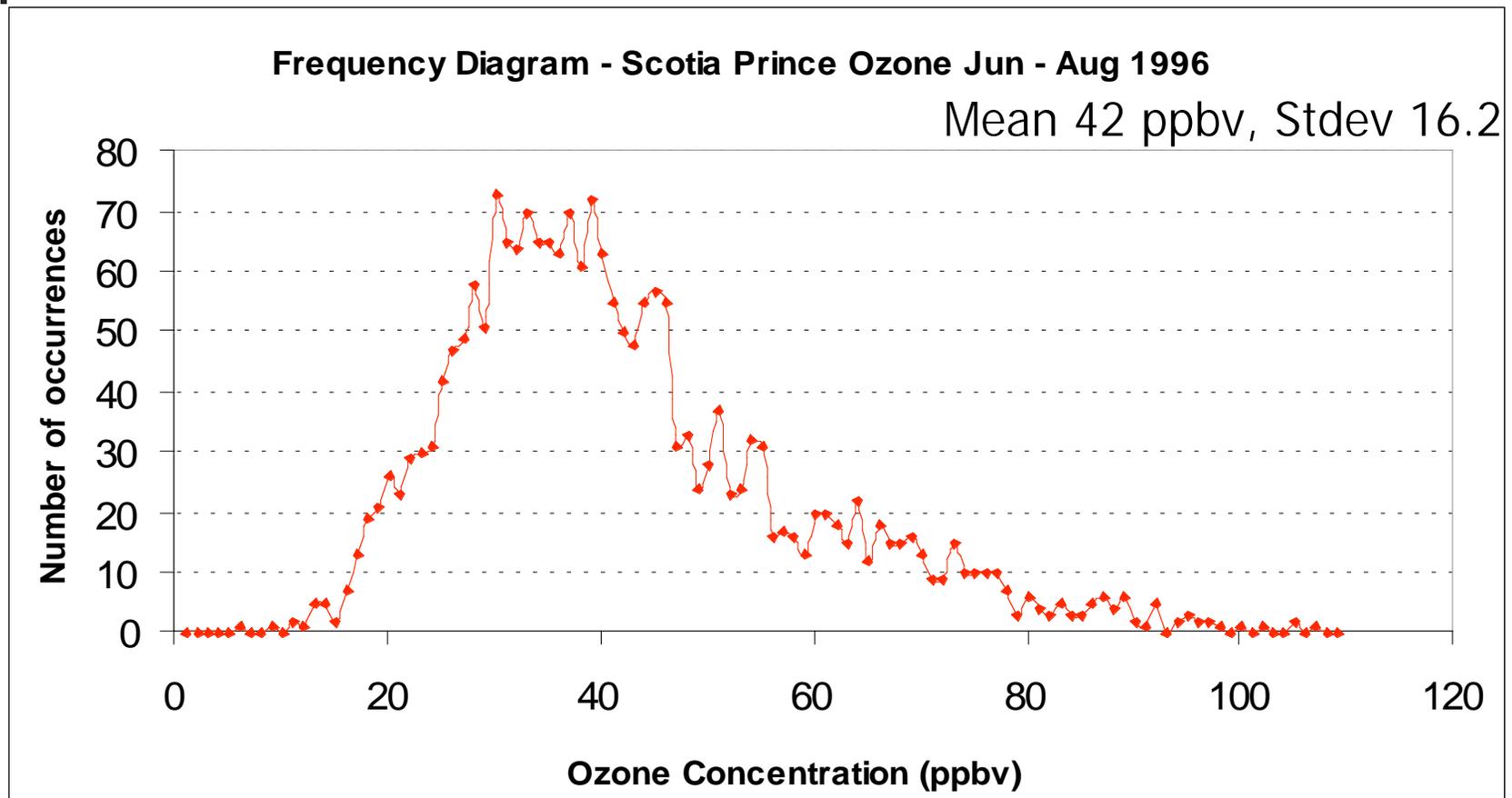
Courtesy CMC archive

Surface Analysis 1200 UTC, July 22, 2004



Courtesy CMC archive

Scotia Prince - Data Distribution, Jun-Aug 1996



Courtesy Maine DEP